A Nuffield Scotland Award

Fresh Herb Production

Fiona Lamotte 2008

‘Extending Seasonal Production in Fresh Herbs assisted by Renewable Energy Solutions’

Contents

ACKNOWLEDGMENTS and THANKS

Starting at the beginning I should acknowledge how grateful I am to 'The first Person who told me about Nuffield' - I would never have had the experiences or met the people I have without that conversation and encouragement to have a go! –

A BIG THANK YOU

My family (all of them!) for encouraging and supporting me and surviving the near panics when I have had reports and deadlines to meet!

The staff at Scotherbs - none of this could have been done without them.

All the Nuffield Scholars I have met through the course of my adventures.

The Nuffield staff for their encouragement and help – and timely reminders!

All the wonderful people I met on my travels who are welcome to visit at anytime – some have already!

Lastly but by NO MEANS least I would like to say what a privilege it has been to be the first scholar to gain the new Scottish award. I would like to give a sincere 'thank you' to those businesses and past scholars who between them raised the funds and made my Nuffield Scholarship possible.

BACKGROUND

I am Managing Director of Scotherbs based in the Carse of Gowrie near Dundee on the East coast of Scotland. I have two wonderful daughters 17&19, nearly young ladies, and wife to Richard a non agriculturalist but he would make a great farmer! He is currently a successful scientist and businessman whose support and advice has been invaluable. I have always been involved in agriculture to some extent and as a family we have had a connection with food production for several generations. I studied environmental and management science at university and worked with various small companies before returning to work at home.

Dad was a successful dairy farmer until 1984 when the introduction of quotas contributed to his change of plans and a move into Fresh Herbs. At 50 this was a pretty radical move and coupled with the fact that we were based in Scotland where the weather can be problematic there was a fair degree of scepticism about these strange crops! Initially we were very much retail based and open to the public selling garden pot herbs. I was involved in running the herb restaurant business which we operated as part of Scotherbs. In marketing terms this was important as at that time there were no TV chefs and people didn't realise what an exciting addition fresh herbs make to cooking and baking. Then developments in cut herbs took off and we have not looked back since.

SCOTHERBS

Scotherbs serves a wide variety of customer sectors, multiples, food manufacturers, food service companies, wholesale markets We sell directly to customers if they find it difficult to source herbs elsewhere, for example we send fresh herbs by post to the Western Isles on a weekly basis. We are a very customer focussed and orientated company – many of our developments are driven by our customers' requirements. The industry is highly regulated and we currently undertake 12 customer audits on an annual basis. These audits and standards are fairly onerous but are based on food safety and supplying a product to meet the legal and quality standards. They have overall ensured that we have developed into a better company although there are still many areas where we feel we can improve.
Currently we employ 140 full time staff and 24 seasonal employees. This is one of the biggest responsibilities and one of the steepest learning curves we have had to go through. As equally important to us as the customer, our special staff are what makes Scotherbs successful. Retaining the family ethos but moving into a more professional market place dealing especially with supermarkets has meant attracting some experienced staff. I am a firm believer in surrounding yourself with the best people to get the best job done. We now have a full time HR manager and although we have some way to go we would like to reach 'Employer of Choice' status!

We have doubled our turnover in the last 4 years and the market is still growing so keeping up with developments and hopefully ahead is very important to us and we are not averse to experimentation! All this has to be done within tight financial operating constraints as it is now more important than ever to be financially competitive within the industry.

We currently have to import fresh herbs from October to April/May, mainly from countries around the Mediterranean and Africa. We have long term supply partners that we have grown with and we realise how important this is to our success. They too are required to meet the audit standards related to food safety.

Our home grown operation is vital to our business. Initially as a company we put significant emphasis into developing the customer base and the market through encouraging people to use fresh herbs. The growing operation to a certain extent lagged behind. We also trialled a farm in Tenerife for 3 years however due to the output, quality, management and logistics it was not viable. In 2008 we recruited an experienced growing manager to allow more emphasis on the growing arm of Scotherbs. As such we have successfully doubled our growing area in the last 2 years and are now actively evaluating systems to extend the growing season in Scotland

The UK Fresh Herb market can be segmented into 3 main areas – cut herbs and pot herbs through retailers, cut herbs to food service and wholesale markets, prepared herbs for food manufacturers.

There are approx 8 main herb companies involved in the UK industry – although it is a growing market it is still relatively small and scale is important to meet the financial and operating criteria of the main customers. The majority of the cut herb market is serviced by the major multiples so in terms of volume customers there is limited scope. Presently there is more than sufficient capacity in terms of packaging and processing but as I mentioned earlier the industry is very reliant on imported product especially at each end of the UK season therefore there are opportunities for UK growers in certain herb crops. This opportunity and the reliance on imported products were the drivers behind my Nuffield Scholarship.

The horticultural industry and the herb industry in particular are quite separate from mainstream agriculture and I was unaware of Nuffield Scholarships. As I am sure in a lot of cases small developing businesses demand more time than you can give and I was focussed on Herb World! The application form on its own was quite a challenge as was the interview procedure – I can still remember my surprise and delight when told I was awarded a scholarship. It was going to be the opportunity to meet a group of likeminded enthusiasts and talk about all areas of agriculture and swap ideas.

The contemporary scholar's conference in Melbourne was a wonderful experience – hearing about other scholar's projects, listening to presentation from returning Australian scholars as well as the amazing visits and meetings covering many different areas of agriculture. I was totally in awe, I remember one scholar's comment that they hoped to undertake their scholarship with an open mind, but not so open that it fell out! That comment made a big impression on me – I was so excited about the forthcoming year that I had to check myself to make sure that I did not trip over my enthusiasm.

I was still nervous about the thought of taking time away from Scotherbs to complete my study tour but in retrospect this was such an important part of the scholarship. We had at that point set up a fairly robust senior management team and it gave them the opportunity to operate without me interfering on an hourly basis! It also made me realise that I do not have to know every minute detail.

My report title evolved from a broad' Herb Production 'title to 'Extending seasonal production in fresh herbs using renewable energy solutions'. This was to be my main focus although my study tour encompassed all areas of the herb businesses I visited.

As I mentioned earlier we as a company are very reliant on imported herbs. Initially my thoughts were around the risks that were associated with this strategy from a commercial view point both from a Scotherbs and UK point of view. I felt strongly that we should be trying to minimise this dependence. This was coupled with the potential environmental impacts of increased volumes of product being transferred around the globe. I began to realise that Fresh Herbs are only part of the larger picture and the UK was sadly slowly losing the skills associated with pushing the boundaries to grown our own food. It was too easy to take the other option – 'Importing produce'. This associated with an increased awareness of the potential global food shortages and the consequences of 9 billion people requiring to be fed by 2050 enforced my views that we should be looking at innovative methods of growing – not just for herbs but for many crops and food production businesses. Due to the nature of the retail market the consideration of costs of production is a major player in any decision. Whether bidding for business, keeping existing business or getting new business prices have to be competitive. Herbs are thought of as a luxury product, they have a short shelf life and quality is essential yet they only command a fresh produce margin. We require being able to produce fresh herbs out of season at the same or lower cost than imported product. If we manage this we will have reached our companies commercial and sustainability goals. Additionally it gives us greater control over supply and quality.

Growing in all areas requires energy and even more so when the climate or location is not the plants natural environment. I have always been interested in renewable energy. There is an abundance of naturally occurring events happening all around us that can be harvested to generate energy. Scotland has an abundance of renewable energy potential (except PV or solar in the winter!) The science is developing and we have to find a way of harnessing and affording this energy which coupled with novel growing techniques could lead to fresh herbs and other products being grown throughout the year. It is very important to explore these developments and push the boundaries of existing growing methods.

MY STUDY TOUR

Herb growing in the UK is influenced greatly by the climate. My prime decisions in deciding where I would travel to was the hope of finding areas where there were similar climates (especially to Scotland) and I could study growing innovations and developments in both protected and outdoor growing which I could transfer back to the UK . I also met some interesting herb and similar product growers when I was in Melbourne who were based in Tasmania and wanted to include them in my itinerary.

Eventually I settled on travelling to Tasmania. New Zealand, British Columbia and Nova Scotia. Even typing the route makes me realise once again how privileged I am to have had this opportunity. I have given a brief outline of my time in each country and the wonderful people and ideas I was lucky enough to experience. I was impressed by their approach and innovation and would love to share their experiences with you.

TASMANIA

Island Of Inspiration - Explore the possibilities!

Tasmania was full of innovation and inspiration. Small herb producers supplying regional markets, through to one of Australia's larger most progressive baby leaf and salad producers, Houston Salads supplying approx 20% of the fresh cut market in mainland Australia.

Tasmania has many diverse growing operations: herbs, wasabi, greenhouse tomatoes, salad leaf, morphine poppies, essential oils, bio fuel production, hydroponic forage, truffles and I am sure a host more that I did not have the time to visit - maybe next time! With a population of 400,000 and a land area of 70,000 Km square, Tasmania is the 26th biggest island in the world – sitting at latitude 42' south with high levels of sunshine.

Climatic challenges are evident in Tasmania with water being plentiful in the west coast and the drier plains of the east suffering from near drought conditions. There is a possible solution with the very supportive pro–farming government promising to investigate the transfer of water from the west coast to the east.

I have to mention the hospitality and warm welcome from my hosts in Tasmania - Jane Bennett and family –Ashgrove Cheese – a family of successful Nuffield Scholars. They have a wealth of knowledge of all types of food production in Tasmania and I can highly recommend a visit to Ashgrove Cheese Factory.

J & A Brandsema Pty Ltd (Tomato growers) - Nuffield Scholar
Turners Beach, Burnie, Tasmania jbrandsema@bigpond.net.au
Houston Farms (Large scale salad and leaf growers)
121 Backhouse Lane, Cambridge, Tasmania leepeterson@houstonfarms.co.au
Ian Farquhar (wasabi) Nuffield Scholar wasabi.tas@bigpond.com
Ashgrove Cheese - Jane Bennett, Nuffield Scholar
Elizabethtown, Tasmania info@ashgrovecheese.com.au
Rob Henry – Biofuels ,essential oils and more!
Woodrising, Cressy, Tasmania woodrising@netspace.net.au
Hills Transplants Pty Ltd, Don, Devonport, Tasmania – jhill@tassie.net.au


Wasabi Growing in Tasmania - and now Scotland!

NEW ZEALAND

With an approximate North to South distance of 2,000 miles and a population of 4.5 million, situated between 36' and 43' south with varying levels of sunshine from 1600 hours in the south to 2050 hours in Auckland. New Zealand has a land mass the same size as the UK but a population similar to that of Scotland. All the small scale herb businesses are understandably located around the main centres of population and are therefore close to their markets. There are 4 main herb growers in NZ - 2 in the north island and 2 in the south. The herb market is well developed with the retailers leading the way and introducing new quality standards similar to the UK. Progressive businesses are developing and investing to meet these increased demands but the investment involved has deterred some. Pot herbs are also being sold in the 2 main retailers, Progressive and Woolworths. This is the traditional market in NZ but it is quickly being overtaken by the cut herb product as is happening in the UK.

Most herb production takes place in hydroponic tunnels (usually double skinned) or greenhouses, mostly due to seasonal requirements and also perceived potential micro contamination issues. These issues seemed to be decreasing with the erection of temporary protected outdoor structures. I was constantly amazed at the lack of outdoor growing – especially in the height of the summer however, this looks like it may be changing increasingly for the larger scale field herbs that are traditionally grown in the UK.

Superb herbs, Auckland - Charles Pike info@superbherbs.co.nz

Pezaro Family Farms –

774 Coatesville Highway, Auckland johnandjill.pezarro@gmail.com

Tasman Bay herbs -Yoka De Houwer www.tasmanbayherbs.co.nz

New Zealand Fresh Cuts – 22 bell Avenue Otahuhu, Auckland

Info@Nzfreshcuts.co.nz Ashley Berrysmith

Kerrindale Produce Neil Kerr – 83 Tulls Rd Rangiora

Double skinned tunnels in NZ

Yoka De Houwer - Tasman Bay Herbs - a wonderful place to grow fresh herbs!

BRITISH COLUMBIA

Vancouver has one of the most exciting vibrant culinary cultures that I have ever seen. Varying formats of large retail chains all positioned at the higher end of the market are supplying an incredibly wide selection of fresh products. Lots of dandelions leaves!

Vancouver is situated 49' North of the equator with high summer levels of sunshine and damp, cloudy winters. Due to this climate Vancouver also has to import product for approx 6 months of the year but there is a drive to supply Canadian product where possible. The market is supplied by a number of smaller producers as although it initially looks large it was quoted as being 8 million Canadians within 48 hours driving of Vancouver. There are the bigger markets over the USA border. However delays in exporting to the USA can cause supply difficulties so smaller companies dealing in short shelf life products are not prepared to keep trying. One of the most amazing locations of any herb company I have visited was on a small island in the middle of the Fraser River and their supply chain included a ferry. They coincidentally had the biggest and best range of unusual products and supplied many restaurants in the city.

Barnston Island Herbs – www.biherbs.ca PeterHoffman

Evergreen herbs – info@evergreenherbs.com Ron and T J Brar

Selection of Speciality Boutique Food Stores - Vancouver

Meinhardt Fine Foods, Wholefoods, Granville Island Market, Capers, Urban Fare, Choices

Peter and Di Hoffman with their wonderful sweet white popcorn Shoots, which are delivered daily to the restaurants of Vancouver using the ferry from Barnston Island Herbs.

NOVA SCOTIA

Situated at latitude 44'N, with average annual levels of sunshine, between 1700 and 1850 hours.

I arrived at the end of March in Halifax to be met by a snow storm and 20cm snow drifts across some roads. (Felt very Scottish) This weather did not seem to deter any of the growers or fresh produce suppliers. Small micro leaf and basil were being supplied to the oldest Farmers Market in North America in the city of Halifax. Their delicious green and red leaves in the middle of a snow storm were quite a sight. Once again the culinary offerings through the retailers were some of the best I have seen. Much of the out of season growing is done in tunnels or greenhouses using wood fuelled boilers. There is much debate about the cost effectiveness of these systems and product grown in some of the older systems can only be sold in the farmers markets by the grower directly as the margins are very low and the grower needs the premium.

Nova Scotia in general has a very strong food culture supported by state initiatives such as Select Nova Scotia and Taste of Nova Scotia as well as a wonderful selection of local regional farmers markets - strap line being Buy Local, Eat Fresh.

River View Herbs Maitland, Nova Scotia

Jim Bruce - Amazing micro leaf herbs grown in tunnels in the snow

Pete's Frootique – Halifax Nova Scotia – wonderful local and speciality food store

Richard Melvin Annapolis, Nova Scotia - farm@vitabite.com Nuffield Scholar

Halifax farmers market - founded in 1750 oldest in Canada

John Lohr www.Farmerjohnsherbs.com Specialist Savoury grower - Nuffield Scholar

Herb growing in Halifax Nova Scotia
end of March 2009

INSIDE **OUTSIDE**

Pictured above are photographs of two polytunnels side by side in Halifax –the left hand one is heated with A wood fuelled boiler hot pipe system and the right hand photo shows a tunnel that has lost the cover due to the extremes in weather!

GROWING TECHNOLOGIES SUITABLE FOR FRESH HERB PRODUCTION

OUTDOOR PRODUCTION –

Much of the outdoor fresh herbs production I witnessed on my study tour was similar to the UK although in the countries I visited it was generally on a smaller scale, relative to the business and market size.
Climate and location were the main deciding factors in determining options for outdoor growing.
I could in no way consider that I discovered any great advances in outdoor growing - As much as there may be standard protocols for various herb varieties there are many variations to this, dependant as I said on location, climate, soil type and availability of water.
In New Zealand there was a greater awareness as they saw it of the potential contamination issues associated with producing outdoor crop – mainly microbial contamination, e'coli, salmonella, giardia etc and as such most of the fresh herbs companies that I visited were growing hydroponically. Since that time a few have been to visit us in Scotland and are now keen to expand their outdoor growing.
Most of the large scale salad leaf growers were using controlled traffic and precision farming methods. Permanent beds with minimum tillage were also evident, as was the state of the art equipment for all aspects of salad leaf production from ground preparation and drilling through to harvesting. Many advancements are spin offs from other produce areas.
Soil analysis and the nutritional demands of the particular fresh herb crops are still areas that can be investigated further as can the effect of choosing particular varieties in certain growing conditions.
As in all vegetable production reliant on the weather there is a case for potentially looking at some method of protecting/heating the soil to allow early access to the fields and enable earlier germination due to increased soil temperatures. The use of reflective mulches to increase the correct spectrum of light reaching the plant and therefore increasing production is an area that is also being trialled.
The recent reduction in the number of available pesticides in Europe especially those that can be used on herbs will also cause ongoing issues with weed control. Mulching, burning, mechanical and hand weeding, stale seed beds and soil sterilization - will all lead to a level of control but there are inevitably going to be reduced yields and increased costs. Crop covers protect the crop in the early stages of growth but they also allow the weeds to flourish.
Terraseed products – where the seeds are part of the woven cover are being promoted as a potential method of escaping the weed issue. These would seem to have more success in glasshouse growing conditions.

PROTECTED GROWING

The main questions when thinking about protected growing are:
What are you intending to grow?
What structure is most suited?
Which growing technique will you employ?
These decisions are also influenced by the anticipated return on your investment and the payback period you feel is prudent.

Protected growing structures come in all shapes, sizes and materials - glass ,various plastics and cladding, polycarbonate, etc - Again the choice of structure comes down to location and the crop you want to protect , you can choose simple rain shelters all the way up to controlled growing environments . In New Zealand and Tasmania there were many double skinned polytunnels and similar structures. Different coloured claddings for polytunnels have also been investigated. These can control plant growth and pest and fungicidal diseases although little work has a yet been done with herbs.
As I have mentioned most of the fresh herb growing I witnessed on my study tour was on a relatively small scale due to market size. Hydroponic growing was more prevalent in NZ and Tasmania. Many conversations I had with growers on my tour were regarding other potential growing methods- However when a system is already up and running the cost associated with changing production methods can be prohibitive and improvements to the existing method are thought to be the best way forward – that is real life!

Sustainable intensification is a phrase that I have come across frequently over the last few years. The necessity to increase production whilst considering the environmental impact of your choices and this has led me to some interesting growing methods. I have outlined some of these below.

- A variety of hydroponic systems – some of which were extremely low cost systems. Bench set ups using white plastic covering with small slits made in the plastic and transplants pushed through them and nutrient rich water flowing underneath -it seemed to work well and after harvesting the whole system was easily removed, cleaned down and ready to go again. This was of course in New Zealand! New Zealand growers had some of the most productive low cost systems you could imagine, and the herbs were happy!

- At the other extreme are examples of Advanced Vertical Farming systems also using Hydroponic growing. One of the most interesting systems is currently being developed and trialled in Cornwall by a company called Valcent – www.valcent.eu they have set up a trial growing operation at Paignton Zoo to grow lettuce and baby leaves to feed the zoo animals. This system operates on a closed loop dynamic conveyor belt and automatic feeding stations to grow plants efficiently on a moving platform with static grow lighting and it is stated that it can increase crop production by 20 times per annum for a similar area horizontal bench system, but understandably the capital costs are higher. There is a great deal of interest in this system, especially in areas of restricted water. The concept is correct but very much in its infancy in terms of commercial scale.
- Another hydroponic project is a company called Hydronov. They are using a floating raft system to grow lettuces and baby leaves www.hydronov.com . This consists of a large tank of water with floating grow mats in which the transplants are placed. This system could be adapted to certain fresh herbs and can produce as much as 6 times the number of crops to a similar soil based growing area.
- Aeroponics (nutrients being transferred to the plant roots through a water spray system) and Aquaponics (incorporating fish and hydroponics) are both in their infancy as regards herb production but both have potential.
- Warehouse growing or plant factory farms as they are called in Japan should not be dismissed, especially when they are incorporated into a renewable energy source – or tap into an existing energy source that is currently not being utilised, e.g. heat as a bi-product of distillation. These farms are similar to the environmentally controlled glasshouse production that presently happens for tomatoes, cucumbers and peppers. They use hydroponic growing methods in an insulated building with artificial lighting, where the growing conditions are controlled by computer.

There are many benefits to these systems, less water usage, less pesticide usage, less risk of microbial contamination, less potential for light contamination, reduced risk in general as all variables can be controlled –These grow rooms can also be situated in unused rural buildings, or even better next to the distribution depots for the major multiples, or set up as local community growing areas. The down sides are the quantity of electricity used for the lighting and total energy use overall and therefore increased costs. As yet there are little records available regarding the potential lack of flavour, taste and nutritional value and also the perception of an unnatural product!

Growing lights are currently being developed that will alter the specific growth characteristics of plants - there are some trials being carried out to establish whether supplementary lighting with LED's would sufficiently increase production to justify the capital required. In recent years, it has become increasingly cost-effective to use artificial lights for assisting plant growth. Lighting costs and lamps have become less expensive, and very efficient light sources are now available in high wattages.

Artificial light can be used for plant growth in three different ways:

- To provide all the light a plant needs to grow
- To supplement sunlight, especially in winter months when daylight hours are short.
- To increase the length of the "day" in order to trigger specific growth and flowering

PAR - Photo synthetically Active Radiation

Plants need balanced, full-spectrum light for good health and optimum growth. The quality of light is as important as quantity. Plants are sensitive to a similar portion of the spectrum as is the human eye. This portion of the light spectrum is referred to as photo synthetically active radiation or PAR, namely about 400 to 700 nanometres in wavelength. Plants respond more effectively to red light and to blue light, the peak being in the red region at around 630 nanometres. Red light provides the most efficient food for plants. However, a plant illuminated only with red or orange light will fail to develop sufficient bulk. Leafy growth (vegetative growth) and bulk also require blue light. Many other complex processes are triggered by light required from different regions of the spectrum. The correct portion of the spectrum varies from species to species.

Temperature, humidity and airflow are all currently factors being faced in conventional glasshouse growing. I saw many examples of very basic biomass boilers being used on my study tour - wood chip, sawdust etc. CHP combined heat and power systems are also being used by many glass house growers – providing heat, electricity and CO2 for enhanced productivity. All forms of energy generation have to be considered when looking to install any protected growing operation. Ideally a source of hydro power would be the best solution and provide a fairly consistent energy source, but this very much depends as with all renewable energy on location.

Renewable Energy Solutions

On farm energy generation has become more attractive with the recently announced feed- in tariffs that are to be introduced from the beginning of April. These feed in tariffs are sometimes referred to as 'Clean Energy Cashback' and will be available through licensed electricity suppliers. The scheme is intended to encourage the uptake of small-scale low carbon technologies up to 5MW, through tariff payments made both on generation and export of produced renewable energy.

How the scheme works

If you are eligible to receive the FIT then you will benefit in 3 ways:

1. **Generation tariff** – a set rate paid by the energy supplier for each unit (or kWh) of electricity you generate. This rate will change each year for new entrants to the scheme (except for the first 2 years), but once you join you will continue on the same tariff for 20 years, or 25 years in the case of solar electricity (PV).

2. **Export tariff** - you will receive a further 3p/kWh from your energy supplier for each unit you export back to the electricity grid, that is when it isn't used on site. The export rate is the same for all technologies.

3. **Energy bill savings** – you will be making savings on your electricity bills , because generating electricity means you don't have to buy as much electricity from your energy supplier.

The Energy Saving Trust www.energysavingstrust.org.uk

The Carbon Trust - www.carbontrust.co.uk

Table of Feed-In Tariff levels

A complete listing of all Feed-In Tariff levels for systems installed before April 2012.

Energy Source	Scale	Generation Tariff (p/kWh)[A]	Duration (years)
Anaerobic digestion	≤500kW	11.5	20
Anaerobic digestion	>500kW	9.0	20
Hydro	≤15 kW	19.9	20
Hydro	>15 - 100kW	17.8	20
Hydro	>100kW - 2MW	11.0	20
Hydro	>2kW - 5MW	4.5	20
Micro-CHP[B]	<2 kW	10.0	10
Solar PV	≤4 kW new[C]	36.1	25
Solar PV	≤4 kW retrofit[C]	41.3	25
Solar PV	>4-10kW	36.1	25
Solar PV	>10 - 100kW	31.4	25
Solar PV	>100kW - 5MW	29.3	25
Solar PV	Standalone[C]	29.3	25
Wind	≤1.5kW	34.5	20
Wind	>1.5 - 15kW	26.7	20
Wind	>15 - 100kW	24.1	20
Wind	>100 - 500kW	18.8	20
Wind	>500kW - 1.5MW	9.4	20
Wind	>1.5MW - 5MW	4.5	20

There is a great opportunity for many agricultural and horticultural businesses to supplement their income whilst also contributing to the drive to reduce our dependence on fossil fuels and contribute to the reduction of greenhouse gases. These energy generation schemes can be on many scales and I feel there is much scope to include them in projects to extend the seasonal growing of many crops – both at a local and corporate level. If you have or are planning to develop a project with relatively high electricity usage it is important to be aware and investigate these clean energy payments.

Conclusions and Recommendations

Looking back at my study tour, as I have done constantly since my return, my overall impression of the fresh cut herb industry in the countries I travelled was of a wonderful collection of enthusiastic, optimistic, individuals that came into herb growing through many different avenues. Each country was full of great characters, for example, the 83 year old Tasmanian who had made his own greenhouse fans from Lorry axels and hardboard paddles and had also constructed his own large freeze drying container for preserving wedding bouquets. Then there was the retired Army chef who was growing baby fern fronds for the Maori market and quite excitedly, the hydroponic lettuce grower who was experimenting with plants growing in salt water...with variable success! I also had the opportunity to visit many other food businesses such as beef jerky, numerous cheese makers (sheep, goat and cow), ice cream, soft fruit and apples and cider makers!

There were many different scales of operation but they all were established by the optimistic entrepreneur. Since my trip I have redefined my ideas around what makes a successful entrepreneur. They have to be decision makers, calculated risk takers, have the ability to persevere under adverse circumstances and, finally, be opportunists who are preferably supported by an understanding partner and family!

We as a society also have to support every level of entrepreneurial activity by encouraging people to take their future into their own hands. This will in itself lead to the great innovation and development that I saw on my 5 week study tour.

My opinions on the development of the herb industry have not majorly changed since embarking on my tour but have been greatly reinforced leading me to make the following recommendations – none of which are rocket science but I intend to follow them!

- Continued investment and resource allocated to research, develop and improve growing techniques at company, industry, regional and government level.
- Cross sector exchange of information and best practice information made more readily available – disseminating information/networking.
- Constantly challenge recognised and accepted restraints to production issues using blue sky thinking to explore and innovate – Ask the question - Why not?
- Continue to inform and educate the consumer of the positive stories surrounding food production – the real cost of food, intensive food production must be made and perceived to be safe, ethical and natural for the consumer.
- Investment support must be available in form of grants or subsidies especially to encourage investment in renewable energy technologies to ensure environmentally friendly, sustainable, commercially viable food can be produced alongside the uncertainty of climate change.
- Ensure that we are constantly reminding ourselves why we are progressing and developing - we have to be aware of the implications of our actions or inaction.

In some form, the above recommendations are all being tackled. We need to simplify our goals and rationalise our aims. From my own experience over complication can lead to confusion.

Consequences of my Nuffield

I think it is important to mention the enormous benefits I feel I have gained from my involvement with the Nuffield Trust. I was very stuck in my Herb World although I already had the benefits of involvement in other business sectors and travelled extensively – but mainly from a general interest and enjoyment view point.

I have rekindled my knowledge and interest in agriculture and horticulture as a whole and now feel that I hopefully will be able to offer some contribution in the future to the horticulture world and herb industry in particular. Sometimes it is easy to slip back into the smaller pictures which are of course very important but my Nuffield experience as well as affording me the opportunity to meet some wonderful people has shown me a bigger picture. I have also been able to share this with my family, colleagues and our industry in general. There have been facets of the scholarship that I have struggled with – presentations and reports being the main ones. Preparation and practice are the really the only way forward for me to improve, hopefully I will become better at these and the presentations and reports will become easier!

I was very fortunate to be asked to speak at the Oxford Farming Conference in January primarily due to my Nuffield experiences, reporting on innovation and developments in seasonal herb growing with reference to Scotherbs – another Nuffield generated experience!

I still very much stick with our adopted Scotherbs saying –

AN OPTIMIST SEES OPPORTUNIITES IN EVERY CHALLENGE AND A PESSIMIST SEES CHALLENGES IN EVERY OPPORTUNITY

(Winston Churchill)

We at Scotherbs are eternal optimists as are all the Nuffield Scholars I have had the good fortune to meet! I would just like to share with you a short example of one of my particular Nuffield led adventures:

When in Melbourne at the Contemporary Scholars Conference I met a scholar, Ian Farquhar who grew wasabi in Tasmania. I then met Jane Bennett who used his Wasabi in her famous cheese. I went to Tasmania on my travels and met up with them both and saw the wasabi production. I came back to Scotland and received an email enquiry about trialling Wasabi in Scotland with a Japanese company as Scotland has the perfect wasabi climate! The Japanese company came to Scotland and brought some trial wasabi which is growing well. I am now travelling across to Japan at the end of May to see the Japanese wasabi growing operation and I shall also get the opportunity to visit some of the Japanese controlled plant growing units! -

A PERFECT EXAMPLE OF A NUFFIELD EXPERIENCE!